CLAIMS

We claim:

1. A laser beam dump, comprising:

a housing, wherein the housing includes a first window; and

a solution contained within the housing, wherein the solution comprises a solute that is absorbent at the wavelength of a laser beam and a solvent that is not absorbent at the wavelength of the laser beam, and wherein the first window is configured such that the laser beam may pass through the first window into the solution.

2. The laser beam dump of claim 1, wherein the housing contains a plurality of mirrors arranged from a first mirror to a last mirror, the mirrors being arranged such that the laser beam may pass through the first window and then be sequentially reflected by the mirrors starting from the first mirror and continuing to the last mirror and then back again in reverse sequence to the first mirror.

3. The laser beam dump of claim 1, wherein the housing defines a cylinder having a first end and an opposing second end and wherein the aperture is in the first end of the cylinder.

4. The laser beam dump of claim 1, wherein the housing contains a mirror, the mirror being configured to reflect laser light towards the first window.

5. The laser beam dump of claim 1, wherein the housing is divided into a plurality of sections, from a first section including the first window to a last section, each section enclosing a separate volume of the solution and being separated from the remaining sections by dividing windows such that the laser beam may pass through the first window and through the dividing windows.

6. The laser beam dump of claim 5, wherein the concentration of the solute is different for each section, the concentration being most dilute in the first section and progressively stronger in the succeeding sections, the variation of the concentrations being selected such that the absorption of laser energy in each section is approximately equal.

7. The laser beam dump of claim 6, further comprising an end window in the last section, the end mirror configured to reflect the laser beam towards the first window.

8. The laser beam dump of claim 7, wherein the solute is selected from the group consisting of water, ethanol, methanol, and ethylene glycol.

9. The laser beam dump of claim 8, wherein the solute is water and the solvent is selected from the group consisting of acetone, deuterated water, and carbon disulfide.

10. The laser beam dump of claim 9, wherein the first window and the dividing windows each comprises sapphire.

11. The laser beam dump of claim 9, wherein the first window and the dividing windows each comprise fused silica and are coated with anti-reflective coatings.

12. The laser beam dump of claim 11, wherein the interior of the housing is coated with a reflective coating.

13. The laser beam dump of claim 12, wherein the first window includes a first anti-reflective coating for its exterior surface adapted to minimize reflections from an air/silica interface and a second anti-reflective coating for its interior surface adapted to minimize reflections from a silica/solution interface and wherein each dividing window is coated with the second anti-reflective coating.

14. The laser beam dump of claim 12, wherein each section includes a temperature sensing device.

15. The laser beam dump of claim 12, further comprising a pressure-release fitting attached to the housing and in fluid communication with the solution, the pressure-release fitting enclosing a volume of gas to accommodate expansion of the fluid.

16. The laser beam dump of claim 15, wherein the volume of gas comprises an inert gas.

17. The laser beam dump of claim 15, wherein the volume of gas comprises air.

18. A method, comprising:

providing a solution including a laser-light-absorbing solute diluted in a non-laser-light-absorbing solvent; and

transmitting a laser beam through the solution, wherein the concentration of the solute is such that the laser beam is effectively terminated in the solution and the solution does not vaporize during this termination.

19. The method of claim 18, wherein the solution is contained in a cylinder having a mirror, the method further comprising reflecting the laser beam off the mirror to increase the laser beam path length taken within the solution.

20. The method of claim 18, further comprising cooling the solution.

21. The method of claim 18, further comprising agitating the solution.

22. The method of claim 18, further comprising measuring the temperature of the solution.

23. A laser beam dump for absorbing a high-energy laser beam, comprising:

a housing enclosing a solution, wherein the solution comprises water diluted in a polar solvent that is not absorbent at the wavelength of the high-energy laser beam, the

housing including an aperture; and

a window sealing the aperture, wherein the window is configured such that the high-energy laser beam may pass through the window into the solution.

24. The laser beam dump of claim 23, wherein the housing defines a cylinder, and wherein the aperture is in a first end of the cylinder and wherein the housing contains a mirror at an opposing second end, the mirror being configured to reflect laser light towards the window.

25. The laser beam dump of claim 23, wherein the concentration of water and the volume of the solution are chosen such that the temperature of the solution does not exceed 50° C during use.

26. The laser beam dump of claim 23, wherein the housing includes an agitator to stir the fluid.